UNITED STATES PATENT AND TRADEMARK OFFICE

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10/584,335	06/23/2006	Woo-Yong Lee	123054-06079404	4941

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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10/584,335</td><td>Applicant(s)
LEE ET AL.</td></tr>
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ASHLEY L. SHIVERS</td><td>Art Unit
2477</td></tr>
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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>*23 June 2006*</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>*1-19*</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>*1,5,8,10 and 11*</u> is/are rejected.

7)☒ Claim(s) <u>*2-4, 6-7, 9 and 12-19*</u> is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on <u>*23 June 2006*</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some *   c)☐ None of:

         1.☒ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by

Vanderperren et al. (**U.S. PGPub 2004/0076246**), hereinafter referred to as

Vanderperren.

Regarding claim 10, Vanderperren discloses a method for detecting

synchronization of data transmitted per frame in a wireless local area network system,

wherein the frame comprises a short preamble having a plurality of

repetitive S symbols, and an IS symbol (**See Fig. 2b and [0054]**),

the method comprising:

a) detecting frame synchronization of a short preamble in a form of

a periodically repeated signal according to a characteristic of auto-

correlation of the short preamble (**A first rough carrier frequency offset is**

obtained by the frequency offset estimation unit using an output of the

autocorrelation unit. A first rough symbol timing is obtained by a

synchronization machine using an output from the autocorrelation unit.

The amplitude signal and the phase output from the autocorrelation

unit is supplied to the synchronization machine; See [0056]-[0060]); and

b) estimating timing by performing auto-correlation according to

windows having lengths set to have different periods (**A sliding**

correlation is performed where different correlation distances are used;

See [0057]).

Regarding claim 11, Vanderperren further discloses the method of claim 10,

wherein in a), amplitude and phase of the window of the auto-correlation are both used

for detecting the frame synchronization (**See [0056]**).

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

4.   Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Vanderperren in view of the background of Zhu et al. (**U.S. PGPub 2004/0004933**),

hereinafter referred to as Zhu.

Regarding claim 1, Vanderperren teaches a method for configuring a preamble of

a downlink frame for synchronization and channel estimation in a wireless local area

network system, the method comprising:

a) arranging a short preamble, used for time and frequency

synchronization in a receiver (**The short training sequence (STS) may be used**

for coarse frequency estimation and symbol timing estimation by cross-

correlation; See [0007]), wherein arranging the short preamble comprises

repetitively arranging a plurality of S symbols in the starting points

of the uplink burst and the downlink burst (**A short training having 9**

repetitions of a training symbol B of 16 samples with duration of 800 ns;

See Fig. 2b and [0054]), and

arranging an IS symbol after the S symbols (**The tenth symbol is**

the inverse of B (IB); See Fig. 2b and [0054]); and

b) arranging a long preamble used for fine frequency offset estimation

(**The long training sequence (LTS) may be used for precise frequency**

estimation; See [0007]) in the receiver after the short preamble (**The short**

training symbols are followed by a long training symbol; See [0054]), wherein

arranging the long preamble comprises

arranging a long cyclic prefix (CP) after the short preamble (**CP;**

See Fig. 2b and [0054]), and

repetitively arranging a plurality of L symbols after the long CP

(**See Fig. 2b and [0054]**).

Vanderperren fails to explicitly teach of the short symbol being at the starting

points of an uplink burst and a downlink burst and the long preamble being used for

channel estimation.

Zhu teaches of the short symbol being at the starting points of an uplink and

downlink burst (**Each burst is started with a preamble section which is followed by a**

payload section. A downlink transmission starts with 10 short symbols, but the first 5

are different in order to detect the start of the downlink frame. Uplink packets may

use 5 or 10 identical short symbols with the last short symbol being inverted; See

[0015] and [0017]) and the long training sequence being used for channel estimation

(**See [0019]-[0020]**).

Therefore it would have been obvious to one of ordinary skill in the art at the

time of the invention, to modify the method of Vanderperren to include the short

symbol being at the starting point of an uplink and downlink burst taught by Zhu in

order to detect the start of the burst and perform packet detection, automatic gain

control, symbol training, frequency estimation and channel estimation.

5.   Claims 5 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Vanderperren in view of Zhu in further view of Kelley et al. (**U.S. Patent No. 7,787,357**),

hereinafter referred to as Kelley.

Regarding claim 5, Vanderperren teaches the method of claim 1, wherein in b),

the L symbols are repeated twice (**See Fig. 2b**), but fails to teach of the L symbols

respectively having the length of the data symbol period and wherein the length of the

long CP is twice as long as that of the guard interval.

Zhu teaches of the L symbols respectively having the length of the data symbol

period (**See [0006]**).

Therefore it would have been obvious to one of ordinary skill in the art at the

time of the invention, to modify the method of Vanderperren to include the L symbols

respectively having the length of the data symbol period taught by Zhu in order to

make it possible to do a precise frequency estimation on the long symbol.

Vanderperren in view of Zhu still fails to teach of the length of the long CP being

twice as long as that of the guard interval.

Kelley teaches of the long CP being twice as long as that of the guard interval

(**See Fig. 2 and [0019]**).

Therefore it would have been obvious to one of ordinary skill in the art at the

time of the invention, to modify the method of Vanderperren in view of Zhu to include

the long CP being twice as long as that of the guard interval taught by Kelley in order to

have the impulse response of the channel be shorter than the interval and thus any

channel response resulting from the short preamble will have disappeared before the

long preamble signals occur.

Regarding claim 8, Vanderperren teaches the method of claim 1, wherein

parameters of the preamble comprise a cyclic prefix period (**CP; See Fig. 2b**), a short

train sequence period (**STS; See Fig. 2b**), and a long train sequence period (**LTS; See**

Fig. 2b), but fails to teach of a physical layer convergence protocol preamble (PLCP)

period. Vanderperren in view of Zhu also fails to teach of a physical layer convergence

protocol preamble (PLCP) period.

Kelley teaches of a physical layer convergence protocol preamble (PLCP) period

(**See Fig. 2**).

Therefore it would have been obvious to one of ordinary skill in the art at the

time of the invention, to modify the method of Vanderperren in view of Zhu to include

a physical layer convergence protocol preamble (PLCP) period taught by Kelley in

order to determine the parameters of a physical layer protocol data unit (PPDU) and

train and synchronize the receiver.

Allowable Subject Matter

6.   Claims 2-4, 6-7, 9 and 12-19 are objected to as being dependent upon a rejected

base claim, but would be allowable if rewritten in independent form including all of the

limitations of the base claim and any intervening claims.

7.   The following is a statement of reasons for the indication of allowable subject

matter:

While the combination of Vanderperren et al. (**U.S. PGPub 2004/0076246**),

hereinafter referred to as Vanderperren in view of the background art of Zhu et al. (**U.S.**

PGPub 2004/0004933), hereinafter referred to as Zhu, teaches of having repetitions of

short symbols (**Vanderperren - Fig. 2b, Zhu - Fig. 2 and Kelley - Fig. 2**), and the IS

symbol having the length of the guard interval (**Kelley – Fig. 2**) and being 180^0-phased

with respect to the S symbol (**Vanderperren; See [0059]**), they fail to show more than 10

repeated S symbols. Therefore claim 2 appears to be novel and inventive because prior

art fails to show or teach the S symbol repeated 16 times within a data symbol period.

While the prior art of Vanderperren in view of Zhu and in further view of Kelley

et al. (**U.S. PGPub 2005/0135432**), hereinafter referred to as Kelley teaches of having

different values for the type of WLAN, the PLCP preamble period, the cyclic prefix

period, the short train sequence period, and the long train sequence period, they fail to

show the claimed values. Therefore claim 9 appears to be novel and inventive because

prior art fails to show or teach the preamble provided in a time domain of a 60GHz

WLAN, the PLCP preamble period being set to 6.8μs, the cyclic prefix period being set

to be 0.133μs, the short train sequence period being set to be 2.27μs, and the long train

sequence period being set to 4.53μs.

Claims 3-4, 6-7, 13-14 and 18-19 appear to be novel and inventive because prior

art fails to show or teach the equations for determining the frequency domain signal of

the short preamble, the frequency domain signal of the long preamble, the auto-correlation value and the confirmation-correlation value, respectively.

While Vanderperren teaches of delaying the short preamble by an auto-correlation delay and calculating an average value by multiplying a conjugate complex value of the delayed signal by a received signal, it fails to teach of calculating an average value by squaring the delayed signal in the first step and calculating an auto-correlation value based on the average value calculated in steps two and three. Therefore claim 12 appears to be novel and inventive because prior art fails to show or teach of calculating an average value by squaring the delayed signal in the first step and calculating an auto-correlation value based on the average value calculated in steps two and three.

While Vanderperren teaches of not inserting the IS symbol and using the CP symbol instead (**See [0069]**), it fails to teach of the length of the window of the auto-correlation being set to within 16 samples and a detecting range in the frame synchronization being set to within +/- 8 samples from a start point of the preamble. Therefore claim 16 appears to be novel and inventive because prior art fails to teach of when the CP is inserted instead of inserting the IS symbol, the length of the window of the auto-correlation being set to within 16 samples and a detecting range in the frame synchronization being set to within +/- 8 samples from a start point of the preamble.

Conclusion

8.   Any response to this action should be **faxed** to (571) 273-8300 or **mailed** to:

>   Commissioner of Patents,
>   P.O. Box 1450
>   Alexandria, VA 22313-1450
>
>   **Hand delivered responses should be brought to:**
>   Customer Service Window
>   Randolph Building
>   401 Dulany Street
>   Alexandria, VA 22314

9.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to ASHLEY L. SHIVERS whose telephone number is (571)

270-3523. The examiner can normally be reached on Monday-Friday 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Chirag Shah can be reached on (571) 272-3144. The fax phone number for

the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/A. L. S./
Examiner, Art Unit 2477
3/9/2011

　　　/Gregory B Sefcheck/
　　　Primary Examiner, Art Unit 2477
　　　3/10/2011